

13. (AMENDED ONCE) A method to solve via poisoning for insulative porous low-k materials in a dual damascene structure comprising the steps of:

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providing a substrate having a passivation layer formed over a first metal layer formed on said substrate;

forming a first insulative layer over said substrate;

forming an etch-stop layer over said first insulative layer;

forming a second insulative layer over said etch-stop layer;

forming a first photoresist layer over said second insulative layer and patterning said photoresist to form a first photoresist mask having a hole pattern;

etching said first and second insulative layers, including said etch-stop layer through said hole pattern to form a hole reaching said passivation layer;

removing said first photoresist mask;

forming a low-k protection layer over said substrate, including in said hole opening;

forming a second photoresist layer over said substrate, including said hole opening and patterning said second photoresist to form a second photoresist mask having a trench pattern; .

etching said second insulative layer through said trench pattern in said second photoresist mask to form, a trench in said second insulative layer, thus completing the forming of said dual damascene structure in said substrate;

removing said second photoresist mask;

removing said low-k protection layer from over said substrate and from the bottom of said hole opening and thereby exposing underlying said passivation layer while leaving said low-k protection layer on the vertical sides of said hole opening;

removing said passivation layer from said bottom of said hole opening, thereby exposing underlying said first metal layer;

forming a barrier layer over said substrate, including in said dual damascene structure;

depositing a second metal over said barrier layer in said dual damascene structure; and

A3 performing chemical mechanical polishing (CMP) to complete the forming of said dual damascene structure.

A4 28. (AMENDED ONCE) The method of claim 13, wherein said barrier layer comprises Ta, Ti, TaN, TiSiN, TaSiN, or WN.
